CLAIMS

We claim:

1. In an audio encoder, a computer-implemented method comprising:

receiving audio data in plural channels; and

quantizing the audio data, including applying plural channel-specific quantization factors for the plural channels.

2. The method of claim 1 wherein the plural channels consist of two channels.

3. The method of claim 1 wherein the plural channels consist of more than two channels.

4. The method of claim 1 wherein the plural channel-specific quantization factors are plural channel-specific quantization step modifiers.

5. The method of claim 4 wherein the encoder applies the plural modifiers so as to balance reconstruction quality across the plural channels.

6. The method of claim 4 wherein the encoder computes one of the plural modifiers per channel of a tile.

7. The method of claim 1 further comprising, in the encoder, computing the quantization factors based at least in part upon one or more criteria.

8. The method of claim 7 wherein the criteria include equality in reconstruction quality across the plural channels.

9. The method of claim 7 wherein the criteria include favoring one or more of the plural channels that are more important than other channels perceptually.

10. The method of claim 7 wherein the computing is based at least in part upon respective energies in the plural channels.

11. The method of claim 1 further comprising, in the encoder, computing the quantization factors by open loop estimation.

12. The method of claim 1 further comprising, in the encoder, computing the quantization factors by closed loop evaluation.

13. A computer-readable medium storing computer-executable instructions for causing a computer programmed thereby to perform the method of claim 1.

14. In an audio decoder, a computer-implemented method comprising:

receiving encoded audio data in plural channels;

retrieving information for plural channel-specific quantizer step modifiers; and

decoding the audio data, including applying the plural channel-specific quantizer step modifiers for the plural channels in inverse quantization.

15. The method of claim 14 wherein the plural channels consist of two channels.

16. The method of claim 14 wherein the plural channels consist of more than two channels.

17. The method of claim 14 wherein the decoder retrieves information for one of the plural channel-specific quantizer step modifiers per channel of a tile.

18. The method of claim 14 wherein the retrieving includes getting plural bits indicating precision of the plural channel-specific quantizer step modifiers.

19. The method of claim 14 wherein the retrieving includes getting a single bit per modifier to indicate whether that modifier has a value of zero.

20. The method of claim 14 wherein the applying is part of a combined step for quantization, and wherein for each of plural coefficients the combined step includes a single multiplication by a total quantization amount.

21. A computer-readable medium storing computer-executable instructions for causing a computer programmed thereby to perform the method of claim 14.

22. In an audio encoder, a computer-implemented method comprising:

receiving audio data; and

quantizing the audio data, including applying plural quantization matrices, wherein the encoder varies resolution of the plural quantization matrices.

23. The method of claim 22 wherein the audio data is in a single channel.

24. The method of claim 22 wherein the audio data is in two channels.

25. The method of claim 22 wherein the audio data is in more than two channels.

26. The method of claim 22 wherein the encoder varies the resolution by changing quantization of information for the plural quantization matrices.

27. The method of claim 22 wherein the encoder varies the resolution by changing quantization of elements of the plural quantization matrices.

28. The method of claim 27 wherein the encoder quantizes the elements coarsely for low quality audio data to conserve bits, and wherein the encoder quantizes the elements finely for high quality audio data to preserve quality.

29. The method of claim 22 wherein the encoder sets the resolution on a channel-by-channel basis.

30. The method of claim 22 further comprising, in the encoder, setting the resolution by open loop estimation.

31. The method of claim 22 further comprising, in the encoder, setting the resolution by closed loop evaluation.

32. A computer-readable medium storing computer-executable instructions for causing a computer programmed thereby to perform the method of claim 22.

33. In an audio decoder, a computer-implemented method comprising:

receiving encoded audio data;

decoding the audio data, including applying plural quantization matrices in inverse quantization, wherein the resolution of the plural quantization matrices varies during the decoding.

34. The method of claim 33 wherein the audio data is in a single channel.

35. The method of claim 33 wherein the audio data is in two channels.

36. The method of claim 33 wherein the audio data is in more than two channels.

37. The method of claim 33 wherein the resolution varies due to changing of quantization of information for the plural quantization matrices.

38. The method of claim 33 wherein the resolution varies due to changing of quantization of elements of the plural quantization matrices.

39. The method of claim 33 wherein the resolution is set on a channel-by-channel basis.

40. The method of claim 33 wherein the applying is part of a combined step for quantization, and wherein for each of plural coefficients the combined step includes a single multiplication by a total quantization amount.

41. A computer-readable medium storing computer-executable instructions for causing a computer programmed thereby to perform the method of claim 33.

42. In an audio encoder, a computer-implemented method comprising:

receiving audio data;

computing plural quantization matrices; and

compressing at least one of the plural quantization matrices using temporal prediction.

43. The method of claim 42 wherein the audio data is in a single channel.

44. The method of claim 42 wherein the audio data is in two channels.

45. The method of claim 42 wherein the audio data is in more than two channels.

46. The method of claim 42 further comprising:

decompressing the plural quantization matrices; and

quantizing the audio data, including applying the plural quantization matrices.

47. The method of claim 42 further comprising outputting information for the plural compressed quantization matrices.

48. The method of claim 42 wherein the temporal prediction is from an anchor matrix to a current matrix within a channel.

49. The method of claim 42 further comprising compressing at least one of the plural quantization matrices using direct compression.

50. The method of claim 42 wherein the compressing further includes performing a resampling process on an anchor matrix for temporal prediction of a current matrix with a different size than the anchor matrix.

51. The method of claim 42 wherein the compressing includes:

computing a prediction for a current matrix relative to another matrix; and

computing a residual from the current matrix and the prediction.

52. The method of claim 51 wherein the compressing further includes run-level coding the residual.

53. A computer-readable medium storing computer-executable instructions for causing a computer programmed thereby to perform the method of claim 42.

54. In an audio decoder, a computer-implemented method comprising:
receiving encoded audio data;
retrieving information for plural quantization matrices; and
decompressing at least one of the plural quantization matrices using temporal prediction.

55. The method of claim 54 wherein the audio data is in a single channel.

56. The method of claim 54 wherein the audio data is in two channels.

57. The method of claim 54 wherein the audio data is in more than two channels.

58. The method of claim 54 further comprising inverse quantizing the audio data, including applying the plural quantization matrices.

59. The method of claim 58 wherein the decoder performs the inverse quantizing in a combined step for quantization, and wherein for each of plural coefficients the combined step includes a single multiplication by a total quantization amount.

60. The method of claim 54 wherein the temporal prediction is from an anchor matrix to a current matrix within a channel.

61. The method of claim 60 wherein the decoder resets anchor matrices at the beginning of each frame.

62. The method of claim 54 further comprising decompressing at least one of the plural quantization matrices using direct decompression.

63. The method of claim 54 wherein the decompressing further includes performing a resampling process on an anchor matrix for temporal prediction of a current matrix with a different size than the anchor matrix.

64. The method of claim 63 wherein the size is in terms of number of bands.

65. The method of claim 54 wherein the decompressing includes:
computing a prediction for a current matrix relative to another matrix;
decoding a residual for the current matrix; and
adding the residual and the prediction for the current matrix.

66. The method of claim 65 wherein the decoding the residual comprises run-level decoding the residual.

67. The method of claim 54 wherein the decompressing includes:
computing a prediction for a current matrix relative to another matrix;
getting a bit that indicates the presence or absence of a residual for the current matrix; and
if the residual is present for the current matrix, decoding the residual and adding the residual and the prediction for the current matrix.

68. A computer-readable medium storing computer-executable instructions for causing a computer programmed thereby to perform the method of claim 54.